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WASHINGTON, DC 20005-3960

EXAMINER

MACARTHUR, SYLVIA

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 02/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/814,587

Applicant(s)

ENSINGER, WILFRIED

Examiner

Sylvia R. MacArthur

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12222004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/17/04, 12/16/04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Double Patenting

1. Claims 1-28 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-22 of U.S. Patent No. 6,824,458. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claim 2 of the patent anticipates claim 1 of the present invention by claiming a retaining ring comprising at least two layers. The retaining ring is claimed to be constructed of a plastic material, wherein a metal ring is embedded in the plastic material. The ring further comprises a bearing surface (bearing ring) and a side opposite the bearing surface with fitting elements for fitting the retaining ring on the polishing apparatus.

The term "embedding" obviates that the layers of the retaining ring are not connected by an adhesive and are positively and/or frictional connected. An adhesive would be deemed unnecessary as they layers form an integral design (see language of claim 1 of the patent) and the fitting elements obviate the release,nonrotatble connection of the ring to the polishing apparatus.

The term embedding renders the following interpretations 1) the layers sandwich each other or abut in a vertical directions (layer on top of layer) and 2) the layers plastic layer encapsulates the metal ring.

Claims 3 and 7 of the patent further suggests the limitations of claim 23 of the present invention by claiming that the plastic material comprises at least one of a thermoplastic material, a thermosetting plastic material, and an elastomer. Claims 4 and 8 of patent also suggests claim 24 for the present invention by claiming that the plastic material is a reinforced plastic material, and claims 5 and 9 of the patent anticipates claim 25 and 28 for the present invention by claiming

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the plastic material is a fiber-reinforced plastic material. Claims 13 and 21 of the patent suggests claim 26 of the present invention by claiming that the abrasion-reducing and/or wear-reducing additives are admixed with the plastic material.

2. Claims 1-26 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-28 of U.S. Patent No. 6,913,669, claims 1-22 of U.S. Patent No. 6,824,458. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims of the present invention are broader in scope than those of the patent. Namely, the claims of the patent anticipated the claims of the present invention. For example claim 1 of the patent teaches a retaining ring comprising a carrier ring and bearing ring. The carrier ring is made of a first material that has a higher rigidity than the plastic material of the ring. The bearing ring is made of a plastic material and is arranged concentrically on the carrier ring, is held on its side axially opposed to the first front side releasably, non-rotatably with a positive and or frictional connection and without adhesive to join it to the carrier ring. A table follows to show the relationship between the claims of the patent and the present invention:

Present Invention	Patent
1	1
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5	5

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3. Claims 1-28 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-20 of copending Application No.

2004/0259485. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claim 2 of the patent anticipates claim 1 of the present invention by claiming a retaining ring comprising at least two layers. The retaining ring is claimed to be constructed of a plastic material, wherein a metal ring is embedded in the plastic material.

The term “embedding” obviates that the layers of the retaining ring are not connected by an adhesive and are positively and/or frictional connected. An adhesive would be deemed unnecessary as they layers form an integral design (see language of claim 1 of the patent) and the fitting elements obviate the release, nonrotatable connection of the ring to the polishing apparatus.

The term embedding renders the following interpretations 1) the layers sandwich each other or abut in a vertical directions (layer on top of layer) and 2) the layers plastic layer encapsulates the metal ring as is claimed in claim 10 of the patent.

The ring further comprises a bearing surface (bearing ring) and a side opposite the bearing surface with fitting elements for fitting the retaining ring on the polishing apparatus. Claims 3 and 15 of the patent anticipates claim 23 of the present invention by claiming that the plastic material comprises at least one of a thermoplastic material, a thermosetting plastic material, and an elastomer. Claims 4, 16, and 20 of patent anticipates claim 24 for the present invention by claiming that the plastic material is a reinforced plastic material, and claims 5, 17, and 20 of the patent anticipates claims 25 and 28 for the present invention by claiming the plastic material is a fiber-reinforced plastic material. Claims 13 and 21 of the patent anticipates claim 26

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of the present invention by claiming that the abrasion-reducing and/or wear-reducing additives are admixed with the plastic material. Regarding the use of friction welding (claim 29) as the process to join the carrier and bearings, note that this a product by process limitation and the apparatus of Application No. 2004/0259485 is inherently capable of joining the carrier and bearing rings in this manner.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

4. Claims 27 and 28 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-26 of U.S. Patent No. 6,913,669, in view of Chen et al (US 6,390,908).

The teachings of USP 6,913,669 were discussed above.

Regarding claim 27: The patent fails to teach a bearing ring is made of two layer or components.

Chen et al teaches a retaining ring 22 which includes a bottom layer (bearing ring 34) and a top layer (carrier ring 36). The bottom layer is made of a plastic. The bottom layer is made of a fiber-reinforced plastic and the top layer is made of a plastic with a different fiber used to reinforce it. Since the bottom is noted at as a wear ring, it anticipates the limitation of claim 1 wherein the top material of construction is more rigid than the bottom. See col.4 lines 1-62 and Figs. 2,3, and 4A. Note col.4, lines 19-21 teaches that the bearing ring can have more than two layers. The number of layers used to form the bearing ring is a matter of optimization based upon the type of material of construction used to form the layer and the material of the pad. Generally, the number of layers will be

matched with the optimal replacements of bearing ring to maintain throughput of the polishing process. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide fiber-reinforced material for the bearing.

Regarding claim 28: The patent fails to teach a carrier ring is made of reinforced plastic material.

Chen teaches a reinforced plastic for both the upper and lower rings. The motivation to modify the teachings of the patent to construct the carrier ring of a reinforced plastic is that the material provides additional mechanical strength to the carrier ring and lessens the need to replacement due to wear/tear during the polishing process. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide reinforced plastic as the material of construction for the patent named in this double patenting rejection.

5. Claim 29 is (provisionally in regards to the co-pending application) rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-26 of U.S. Patent No. 6,913,669, 1-20 of copending Application No. 2004/0259485, claims 1-22 of U.S. Patent No. 6,824,458, in view of Turner (US 4,390,384).

The teachings of the co-pending application and the patents held to applicant were discussed above.

All fail to claim the use of friction welding to adjoin the carrier ring to the bearing ring.

Turner teaches a method and apparatus for bonding thermoplastic materials to another.

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The motivation to join the two layer retaining ring of the co-pending application or the patents held to applicant is that the resulting weld is high impact and provides optimal dielectric strength and a smooth overall appearance as taught in the abstract of Turner, and col. 4 lines 21-66. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to friction weld the layers of retaining ring together as this form of joining has advantages taught by Tuner.

6. Claims 30-32 are (provisionally in regards to the co-pending application) rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-26 of U.S. Patent No. 6,913,669, 1-20 of copending Application No. 2004/0259485, claims 1-22 of U.S. Patent No. 6,824,458, in view of Tseng et al (US 6,835,125) and the *Materials by Design* excerpts.

The claims of the co-pending application and the patents held to applicant were discussed above.

All fail to claim pretreating the carrier ring with a coating made of metal beads.

Tseng et al teaches a retaining ring with a wear surface for CMP. The ring is taught to comprises an inner layer and a outer layer which comprises a material of construction that is different from the inner layer. The outer layer has been powder coated (beads are formed during the spraying process) onto the inner layer. The basic difference between the inner and outer layer is that the outer layer 180 is less rigid than the material of the inner layer 184, see col. 3 lines 1-47.

Tseng et al fails to teach that the outer layer is a metal. Col. 4 lines 60-67 of Tseng et al teaches that the inner layer is made of stainless steel for example. According to the *Materials by*

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Design excerpt, stainless steel has a elastic modulus of 190-200 GPa while other metals are listed as having lower elastic moduli and would be thus less rigid. For example, Cu has a modulus of 124. Using the Table of Elastic Modulus of Metals, Ceramics, and Polymers, as seen in the excerpt of the *Materials by Design* once one of ordinary skill chooses the material of construction of the metal carrier ring the table could be used to choose a material which a modulus that is lower that meets the stress specification of the wear and tear of the ring.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the apparatus as claimed by co-pending application and the patents held to applicant to provide a metal carrier ring that has been spray coated to form a coating of metal beads.

Regarding claim 31: Tseng et al teaches that the thickness of the outer layer 190 is between 60 miles (1524 microns) and 80 mils (2032 microns). The motivation to provide an outer layer within this range and thus obviously suggests a range of 700microns or more is that the sprayed coating must sufficient for a convention number of polishing cycles without replacement see col4 lines 1-8 of Tseng et al. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide an outer layer of 700 microns or more as suggested by Tseng et al.

Regarding claim 32: Tseng et al teaches that the thickness of the outer layer can be 20 mils (508 microns) or when the remaining height is that of the substrate in col. 4 lines 34-41. The motivation to provide the coating of metal carrier ring within the range of 300 to 600 microns as suggested by Tseng et al is that this range allows for more polishing cycles before having to disrupt polishing to replace the carrier ring. Thus, it would have been obvious for one of ordinary

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skill in the art at the time of the claimed invention to provide the coating of metal carrier ring within the range of 300 to 600 microns as suggested by Tseng et al.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-4, 6-9, 11, 12, and 20-22 rejected under 35 U.S.C. 102(e) as being anticipated by DeMeyer et al (US 2003/0070757).

Regarding claim 1: DeMeyer et al teaches a method and apparatus for two-part CMP retaining ring. DeMeyer et al teaches a retaining ring for a carrier head, comprising a first rigid annular portion (carrier ring) and a second annular portion (bearing ring), see claim 1 of DeMeyer et al. DeMeyer et al further teaches that the second portion 25(bearing ring) is made of plastic, see claim 8 and [0022] of DeMeyer et al. Claims 10 and 11 of DeMeyer et al teach that securing means (fitting elements) are provided to secure the first portion 15 (carrier ring) to the carrier head (polishing apparatus). Claim 1 of DeMeyer et al further states that the first and second portions are screwed together which anticipates the release, non-rotatable with a positive and/or frictional connection, without adhesive.

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Regarding claim 2: DeMeyer et al illustrates in Figs. 1 and 2 that the releasable, non-rotatable, positive and/or frictional connection of bearing ring and carrier ring is made in the area of an outer circumferential surface of the bearing ring.

Regarding claim 3: See [0025] of DeMeyer et al.

Regarding claims 4,7-9: Fig. 1B of DeMeyer et al illustrates this limitation.

Regarding claim 6: DeMeyer et al according to the abstract teaches that upper and lower portion having mating threads.

Regarding claim 11: See [0025] the inset anticipates a ring groove.

Regarding claim 12: See Figs. 1 and 2 of DeMeyer et al.

Regarding claims 20-22: Sections [0025 and 0026] discuss this limitation the screw in this case anticipates the bolt.

9. Claims 1-4, and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Masuta et al (US 6,277,008).

Regarding claims 1-4 and 7: Masuta et al teaches a retaining ring 101 constituted by a lower (bearing ring) resin (plastic) portion 101a and an upper (carrier ring) metal portion 101b, col. 4 lines 38-64. Figs. 1B, 3A, and 3B.

8. Claims 1-4, 7, and 23-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al (US 6,390,908).

Chen et al teaches a retaining ring 22, which includes a bottom layer (bearing ring 34) and a top layer (carrier ring 36). The bottom layer is made of a plastic. The bottom layer is made of a fiber-reinforced plastic and the top layer is made of a plastic with a different

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fiber used to reinforce it. Since the bottom is noted as a wear ring, it anticipates the limitation of claim 1 wherein the top material of construction is more rigid than the bottom. See col.4 lines 1-62 and Figs. 2,3, and 4A.

Regarding the use of friction welding (claim 29) as the process to join the carrier and bearings, note that this is a product by process limitation and the apparatus of Chen et al (US 6,390,908) is inherently capable of joining the carrier and bearing rings in this manner.

9. Claims 1-4, 6-9, 12, 13, and 20-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Zuniga et al (US 6,251,215).

Zuniga et al teaches a retaining ring 110 includes multiple sections including an annular lower portion having a bottom surface 182 that contacts the polishing pad, and an annular upper portion 184 connected to the base 104. The lower portion according to col.5 lines 50-col.6 lines 67 is made of plastic. The upper portion 184 of retaining ring 110 is formed of a rigid material. Zuniga et al teaches that the upper and lower parts are press-fit or joined by bolts 194.

10. Claims 10, 11, and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeMeyer et al, Masuta et al, Chen et al, or Zuniga et al (henceforth known as the *primary references of prior art*), in view of Numoto et al (US 2002/0049030).

The teachings of the *primary references of prior art* were discussed above.

All fail to teach:

Regarding claim 10 (circumferential collar), claim 11 (ring groove), and claims 15-17 (ring groove)

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Numoto et al a wafer polishing device wherein a snap ring (collar/flange) is used as retaining ring attaching part. The motivation to modify the retaining rings of the *primary references of prior art* is to provide a means of attaching the ring to the polishing apparatus with ease without popping out of the carrier, see [004 and 0010]. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide a snap ring to acts as a circumferential collar or flange by releaseably adhering the retaining ring to the polishing apparatus.

Regarding claim 14: The snap ring of Numoto causes a shrinking-in or shrinking-on process of joining the pieces of the retaining ring of *the primary references of prior art* were discussed above. The snap ring clamps down or shrinks the pieces together.

11. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over DeMeyer et al, Masuta et al, Chen et al, or Zuniga et al (henceforth known as the *primary references of prior art*), in view of Turner (US 4,390,384).

The teachings of the *primary references of prior art* were discussed above.

All fail to teach the use of friction welding to adjoin the carrier ring to the bearing ring.

Turner teaches a method and apparatus for bonding thermoplastic materials to another. The motivation to join the two layer retaining ring of the *primary references of prior art* is that the resulting weld is high impact and provides optimal dielectric strength and a smooth overall appearance as taught in the abstract of Turner, and col. 4 lines 21-66. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to friction weld the layers of retaining ring together as this form of joining has advantages taught by Tuner.

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12. Claims 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over the DeMeyer et al, Masuta et al, Chen et al, or Zuniga et al (henceforth known as the *primary references of prior art*), in view of Tseng et al (US 6,835,125) and the *Materials by Design* excerpts.

The claims of the *primary references of prior art* were discussed above.

All fail to teach pre-treating the carrier ring with a coating made of metal beads.

Tseng et al teaches a retaining ring with a wear surface for CMP. The ring is taught to comprises an inner layer and a outer layer, which comprises a material of construction that is different from the inner layer. The outer layer has been powder coated (beads are formed during the spraying process) onto the inner layer. The basic difference between the inner and outer layer is that the outer layer 180 is less rigid than the material of the inner layer 184, see col. 3 lines 1-47.

Tseng et al fails to teach that the outer layer is a metal. Col. 4 lines 60-67 of Tseng et al teaches that the inner layer is made of stainless steel for example. According to the *Materials by Design* excerpt, stainless steel has a elastic modulus of 190-200 GPa while other metals are listed as having lower elastic moduli and would be thus less rigid. For example, Cu has a modulus of 124. Using the Table of Elastic Modulus of Metals, Ceramics, and Polymers, as seen in the excerpt of the *Materials by Design* once one of ordinary skill chooses the material of construction of the metal carrier ring the table could be used to choose a material which a modulus that is lower that meets the stress specification of the wear and tear of the ring.

Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to modify the apparatus as claimed by *primary references of prior art* to provide a metal carrier ring that has been spray coated to form a coating of metal beads.

Regarding claim 31: Tseng et al teaches that the thickness of the outer layer 190 is between 60 mils (1524 microns) and 80 mils (2032 microns). The motivation to provide an outer layer within this range and thus obviously suggests a range of 700microns or more is that the sprayed coating must sufficient for a convention number of polishing cycles without replacement see col4 lines 1-8 of Tseng et al. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide an outer layer of 700 microns or more as suggested by Tseng et al.

Regarding claim 32: Tseng et al teaches that the thickness of the outer layer can be 20 mils (508 microns) or when the remaining height is that of the substrate in col. 4 lines 34-41. The motivation to provide the coating of metal carrier ring within the range of 300 to 600 microns as suggested by Tseng et al is that this range allows for more polishing cycles before having to disrupt polishing to replace the carrier ring. Thus, it would have been obvious for one of ordinary skill in the art at the time of the claimed invention to provide the coating of metal carrier ring within the range of 300 to 600 microns as suggested by Tseng et al.

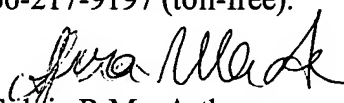
Conclusion

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13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sylvia R. MacArthur whose telephone number is 571-272-1438. The examiner can normally be reached on M-F during the hours of 8:30 a.m. and 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Sylvia R MacArthur
Patent Examiner
Art Unit 1763

February 1, 2006